KYKLOS, Vol. 63 – November 2010 – No. 4, 517–529

Behavior, Human Capital and the Formation of Gangs

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INTRODUCTION

In this paper, we examine the street gang as a special case of the dysfunctional social group, the members of which are often regarded as exhibiting apparently irrational behavior (Gilbert, 2006 and Venkatesh, 2008). Individuals in this setting have nuisance value for the rest of society and engage in considerable risk taking for the benefit of the group. We focus on the formation of street gangs but do indicate possible extensions of our analysis to other gang-like groups, which could include collusive business interests, terrorist cells (Frey and Luechinger, 2003; Frey, Luechinger and Stutzer, 2007), and even sports hooligans (Priks 2010).

Much apparently irrational behavior can be shown to signal possession of skills of value to the gang, which raises a significant qualification to straightforward models of criminal deterrence such as those discussed by Cameron (1988), Opp (1989) and Donohue and Wolfers (2009). Before developing a useful model, we must first pay attention to examples of gang life, and draw in some insights from work by Allen and Reed (2006) on aristocratic elites. The approach in this paper differs from existing work, particularly that by Levitt and Venkatesh (2000a, 2000b), which examined the industrial organization of American drugs gangs and leadership tournaments, and yet concluded that membership of a gang requires some explanation outside of a rational choice framework.[1]

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1. Early papers stressing welfare impacts of organized crime include: Buchanan (1973), Backhaus (1979), Jennings (1984), Gambetta (1994), Dick (1995) and Garoupa (2000). Later work considers the importance of transaction costs: Reuter (1983), Abadinsky (1987), Turvani (1997), and Garoupa (2006). Skaperdas and Syropoulos (1995), Milhaupt and West (2000; 2004), Moselle and Polak (2001), Skaperdas (2001), Sobel and Osoba (2006) and Leeson (2007) focused on the political economy of organized crime. Work on specific criminal activities includes Reuter (1983), Alexander (1997), Konrad and Skaperdas (1997; 1998), Bandiera (2003), Alexeev, Janeba and Osborne (2004), and Kugler, Verdier and Zenou (2005). Chang, Lu and Chen (2005) and Mansour, Marceau and

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We show how apparently irrational aspects of gang members' behavior, for example reckless violence, reflect investment in gang-related skills. Limits to gang formation arise through a comparison between outside and within-gang opportunities, but this interaction is not straightforward. In particular, increasing outside opportunities for gang members may tempt disloyalty, making the gang leader much more selective in admitting members and causing an increase in the nastiness of remaining gangs. Our focus on reckless violence as a key characteristic of street gangs is supported by recent empirical work on recklessness among violent individuals (Foreman-Peck and Moore, 2010).

I. IRRATIONAL BEHAVIOR IN GANGS

Consider the type of street gang often encountered on public housing estates, in shopping centers, and in city locations characterized by a degree of isolation. Such gangs promote a fearful reaction in the normal population, and tend to maintain a fearsome profile. According to Venkatesh's (2008) observations on Chicago gangs, members share in the proceeds of general gang activity, which might involve the drug trade, often on a franchised basis as a form of underground capitalism, and they benefit from a reputation effect in dealings with people outside of the gang. In England, Gilbert (2006) reports London gang members boasting that:

> "We knew that if we approached people in the street they would be scared of us. And we loved it! It was a laugh to watch them cross the street or run away as we approached." (p.89)

Gangs seem to elude control through criminal-justice variables. The behavior is often regarded as not rational because it encompasses such things as continuing to beat up a victim after the robbery is complete, or rushing recklessly at another gang to provoke a fight under poor odds of winning, or participating in binge drinking to a state of near death. This is an escapade of another of Gilbert's (2006) gangs:

> "The Bexley Heath Boys … assembled a huge crew consisting of old men, young kids, heavy-duty blokes from the East End. … we all piled into the pub … Someone was stabbed, someone was thrown in front of a moving car, … one boy got his lung punctured … and another had his skull fractured." Gilbert (2006, 216)[2]

Mongrain (2006) explore law enforcement and gang structure. Bai and Kim (2001) examine reflexive learning in gangs. Calvo-Armengol and Zenou (2004) recognize that social networks play a substantive role in shaping gangs. Recent empirical work includes Seals (2009), who examines the impact of employment opportunities, and Priks (2010), who tests a frustration hypothesis drawn from psychology.

2. See also graphic accounts of such seemingly irrational behavior among Chicago gangs in Levitt and Venkatesh (2000b), and for Manchester, England in Walsh (2003). Earlier material on Chicago is in Thrasher (1968).

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How can this mayhem possibly be rational? By any stretch of the imagination it is sheer lunacy because it represents fighting when the odds are clearly stacked against you. Rational considerations should send you off in the other direction, as quickly and as far as possible. Given the apparent irrationality of gang behavior, many commentators outside of economics see it as reflecting unthinking socialization into a group, often reinforced by media culture. Analyses identify processes rather than impetus: "… The borders are transgressed … a culture of compensatory masculinity over accentuates the violence of the wider culture, which in turn influences music and film, which in turn … influences gang culture (White 2004, 46)." Similarly, Klein (1995, 234) states, "Street gangs are an amalgam of racism, of urban underclass poverty, of minority and youth culture, of fatalism in the face of rampant deprivation, of political insensitivity, and the gross ignorance of … most of us who don't have to survive there."

Levitt and Venkatesh (2000a) closely tie the industrial organization of gangs to economic incentives, but conclude that some of the incentive must be non-economic.

> "Gang wars are extremely costly in terms of injuries, death, and profits. Nonetheless, fighting takes place over roughly one-fourth of the sample … risk of death among gang members appears to be extremely high. … even in this financially sophisticated "corporate" gang, it is difficult … to reconcile the behavior of the … members with an optimizing economic model without assuming nonstandard preferences or bringing in social/non-pecuniary benefits." Levitt and Venkatesh (2000a, 786)

All these observations raise a tremendous puzzle, but overlook the possibility that the rational purpose of behavior may not be immediately obvious. A clue to the rational base for the typically reckless behavior of gang members is found in a different literature, focusing on group norms. Not all groups exhibiting apparently irrational behavior are dysfunctional. In their analysis of dueling among aristocratic elites, Allen and Reed (2006) show that the rules of dueling evolved between the sixteenth and twentieth centuries to provide a screening device enabling a monarch to find a class of individuals possessing high integrity, upon whom reliance could be placed in forming a type of civil service. The rules of challenge and acceptance, together with rules governing the operation of a duel, were apparently bizarre and irrational, and exposed one to criminal prosecution; but, at the same time, screened for honesty, bravery and a high quantum of reputation in a class of 'gentlemen'. Obedience to a norm emphasizing honor and bravery, under rules carefully designed so as not to favor the skilled fighter, acted to screen out those who could not be relied on to act with integrity under a gentlemanly code, given that the required attributes were not directly observable.

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Although dueling took place among the aristocracy,[3] it is striking how the underlying attitudes parallel those found among modern low-class street gangs. Gilbert (2006, 92) notes in relation to retaliatory attacks among youth gangs, how it is important not to lose face, not to slink away from a challenge, and at all costs to preserve reputation. As one London gang member reported:

> "Richard was the gang leader, and he would hype us up. His common gambits were: 'That guy was looking at me … laughing at me.' The whole lot of us would pile into him." (Gilbert p.88)

A Chicago policeman told Venkatesh:

> "They kill … for stupid reasons … You spoke to my girlfriend … you walked down the sidewalk on my territory … You looked at me funny … I'll kill you." Venkatesh (2008, 97)

Compare the earlier comments of Billacois for a vastly higher social rank:

> "Duels were fought over an insult, a slap to the face, a slur on reputation, 'coolness of manner,' or, most serious of all, an accusation of lying." Billacois (1990, 9) cited by Allen and Reed (2006, 83).

It is possible to refer to both types of behavior as a form of integrity, in terms of sticking to one's essential values through thick and thin, when viewed from the perspective of the group, respectively a low-class gang and an aristocratic elite. A sense of disproportion permeates examples for both. The causes of a duel were often trivial and the 'guilty' party was not necessarily the loser. We find traits that are regarded as valuable within the particular group, which is a form of integrity, however inappropriate that term may appear to be when applied to antisocial behavior in gangs.

Groups of various types are a pervasive phenomenon in which localized objectives dominate relative to those of the wider society, and are dysfunctional if a negative externality (nuisance) flows to the more general population. Some specialist units within mainstream society have similar, but useful characteristics, but are not normally considered as gangs: for example, the military hero carries out reckless missions in which all thoughts of self preservation are subsumed owing to extensive training in reacting with instinctive valor for the group. We exclude the military from analysis in gang terms owing to its being embedded in mainstream society and having a legitimate purpose, at least when governed constitutionally.[4] Problems arise with sub-groups that mainstream society considers not to have a useful purpose. What may be okay in times of

3. Restriction to aristocrats, with the exception of the heir to the throne, is another indicator of 'apparently irrational' elements with indirect purpose. Why not let everyone have a go at it?
4. Excluding cases like the much feared Tonton Macoutes active in Haiti prior to 1986. We thank Dr. W.R. Dougan, of Clemson University for making this point.

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war loses its glamour when occurring between groups of violent hooligans in a city housing estate, or for that matter in the case of a terrorist cell.

II. APPARENTLY IRRATIONAL BEHAVIOR AS INTEGRITY

Examples of antisocial behavior that seem to act as signals of belonging to a gang frequently revolve around recklessness, defined broadly as a level of risk taking in relation to benefits that most people would eschew. Binge drinking involves the consumption of alcohol at levels that might kill, and is apparently often followed by congratulatory statements from fellow gang members (Gilbert 2006, 181). Rushing into opponents' territory and starting a fight, knowing that it is an act of bravado in the face of mighty opposition, typically leads to camaraderie in defeat. Finally, consider the automatic resentment of authority, at school, in the prisons, or in relation to the police (Venkatesh 2008, 98). All of these examples suggest recklessness, which then signals a personality that other members of the gang can always rely on to put gang interests ahead of loyalty to mainstream society.

Deschenes and Esbensen (1997) studied a continuum of juveniles including non-delinquents and gang members. The latter were more impulsive, engaged in more reckless behavior, and were committed to their gang peers, but not to school, parents, nor to non-gang youth. More recently, Foreman-Peck and Moore (2010) found samples of violent offenders in an urban setting in Wales to be more risk taking than non-violent respondents; the questionnaire instrumentation tested for effects such as hyperbolic discounting suggested by the literature in experimental behavioral economics.

Reckless behavior can have indirect value: for example, where the reckless fighter follows a commitment strategy (Schelling, 1980). If the gang member is reckless enough to enter enemy territory and terrorize the opposition, others may well think carefully before attacking as the individual may create a reputation as a dangerous person. The best thing is to terrorize the opposition into anticipating losing any conflict so that they conclude that resistance is futile (Gilbert, 2006). Even if conflict emerges, the opposition will be at a disadvantage owing to pervasive fear, and the weakness may lead to fewer casualties for the gang. There is similarity in this low-cost signal to the historical example of pirate ships' use of the Jolly Roger flag (Leeson 2009). The flag communicated that resistance would result in no quarter, which led to early surrender and the saving of lives. There are other similar historical episodes: for example, the careful projection of a reputation for brutality by medieval Swiss soldiers of fortune engaged in European wars.

Behavior reassuring the group that members will make group interests paramount has, indirectly, a rational purpose. The theatrical events involved in

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such behavior can be seen as investments in improving the gang member's group social capital. For the aristocratic elite, the unobservable integrity variable revolved around honesty and was signaled by dueling. For street gangs, the vital integrity characteristic is recklessness, only manifestations of which can be observed, so that individuals may wish to invest in acquiring it and will signal its possession in colorful ways.

III. A SIMPLE MODEL OF GROUP HUMAN CAPITAL IN A GANG

We now demonstrate formally that rational influences can determine apparently irrational behavior, following a variant on Allen and Reed (2006) extended to explain a gang's formation and behavior.

Assume there is a population of N individuals in which each individual is born with a different level of group human capital, s_i^0, distributed with a cumulative density function $F(s)$, and ranked from highest to lowest, i.e. $s_1^0 > s_2^0 > \cdots > s_N^0$. This level of group human capital measures the reliability and degree of commitment of an individual to the group: that is, the individual contribution to the "gang capital".[5] An individual's initial endowment of group human capital is common knowledge and can be augmented by the individual, at a cost, by investing in acquiring group relevant skills. Taking the case of a street gang, investments could be such things as time spent in acquiring the fearsome appearance of a gang member, in practicing violent acts, and developing the skills of a robber. Investment is sunk as well as observable, and an individual's post-investment level of group human capital is $s_i \geq s_i^0$.

An individual becomes a gang member, or not, depending on whether he has at least the reservation level of group human capital, s^R. Therefore, if $s_i \geq s^R$, the individual is a committed and therefore accepted gang member; if $s_i < s^R$, the individual is not a sufficiently committed gang member and therefore not accepted within the gang. The marginal individual, who invests just enough to enter the group, has an ex ante level of human capital equal to s^*, the equilibrium cut-off level: that is, if an individual has an ex ante human capital level equal to or above s^*, then, ex post, he invests in group characteristics and ends up with a human capital level s^R.

The leader emerges as the individual with the highest level of ex ante group capital, s_1^0. We assume the leader has the ability to start a gang, whereas all other potential members can make group human capital investments and produce illegal output, but cannot start a gang.[6] The timing of gang formation is straightforward:

5. "Gang capital" refers to human capital needed to engage in bad behavior or gang activities.
6. This is a simplification since we are not interested in explaining gang leadership contests here. Notice that the leader is also the member of the gang with the highest *ex post* social capital. Obviously

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1. The leader chooses the reservation level of human capital, s^R, which, together with the cost of investment, determines the size of the gang;
2. Individuals decide on their investments, $s^R - s_i^0$, iff $s^R > s_i^0 \geq s^*$, *in group human capital (therefore determining acceptance within the gang);*
3. Individuals within the gang decide whether or not to betray the gang.

We solve the game backwards for sub-game perfection. Once accepted as a gang member, an individual has the opportunity to betray the group with probability ε (for example, by being offered criminal immunity in return for evidence). The utility from betraying the gang is determined by broadly defined outside opportunities and by the expected treatment given by the authorities.[7] Let us assume that the utility from betraying the gang in a reduced form is $u(s^R)$, where higher levels of group human capital reduce outside opportunities due to the fact that individuals are more compromised.[8] The betrayal mechanism turns out to have very important implications for controlling gangs, discussed separately below.

Total gain to the group, $y(n)$, is a positive function of gang size (n), which is a decreasing function of the cost of acquiring membership.[9] The average share of the gain is $y(n)/n$. Members of the group benefit from sharing in the total gains, but not equally. In the case of a street gang the group total gains would include the gains from robbery, extortion and other gang interactions with the outside world. However, members of the gang have different abilities to appropriate gains for the gang, depending on the level of group human capital.[10] To reflect these differences, let each member enjoy a share of the average gain given by $\beta_i(s^R)\ y(n)/n$, with $0 \leq \beta_i \leq 1$, which implies there is a surplus available for payment to the gang leader.

There are also possibly gains from reputation effects in dealing individually with people outside of the group. Gang members would find ordinary members of the public avoiding conflict with them - a form of personal prestige. Much social interaction between the members of street gangs concerns holding their own within the gang and therefore we assume it is non-decreasing in the group human capital. Let us define a benefit $P(s^R)$ from the prestige attached to being

acquisition of group human capital could also be helpful in leadership contests where the leader of the gang is the person who has shown to be the most reckless in the past.

7. For simplicity, it is assumed that there is no retaliation. Outside opportunities could include joining other gangs.
8. We skip an endogenous model of betrayal to concentrate on the formation of the gang. We believe the reduced form captures the most essential feature of gang betrayal: the more one has engaged in acquiring high levels of group human capital, the fewer outside opportunities one is likely to have.
9. Exposure to detection and punishment is modeled separately and assumed to reduce the payoff of the gang leader. Notice the results of the model are valid even if $y(n)$ is concave in n.
10. The appropriation could be violent and generate significant transaction costs.

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a gang member. Therefore, the expected gain from gang membership to individual i is the sum of the gain as a member plus the expected gain from betrayal:

$$V_i = \beta_i(s^R)y(n)/n + P(s^R) + \varepsilon u(s^R) \quad (1)$$

Group human capital and individuals' investments in it are observable, and increase the share of output individual i can capture plus the prestige attached to being a gang member. They reduce the possibility of betrayal.

After the leader chooses s^R, individuals choose whether or not to invest. By backwards induction, if an individual is born with group human capital equal to or higher than s^R, there is no need for investment. If an individual is born with less than s^R, then investment occurs if the net gains from investment are positive. The equilibrium cut-off level of human capital, s^*, is determined by the marginal individual, and is given by $V(s^R) - C[s^R - s^*] = 0$, where C is the cost of investment in group human capital and zero is the best alternative activity. The marginal individual has $s^* = s^R - V(s^R)/C$.

Ex post group human capital comprises that of:

1. Very committed individuals, born to be gang members with $s_i^0 \geq s^R$, who make no investment and are automatically in the gang;
2. Committed individuals, who have acquired the necessary level of group human capital by investment and are in the gang with $s^R > s_i^0 \geq s^*$;
3. Those who are not gang members with $s^* > s_i^0$.

The ex post distribution of group human capital reflects a separating equilibrium, as shown in Figure 1. There may be a large gap between the characteristics of gang members and the rest of society. The gap reflects the division between those who find it economic to signal and those who do not. A further implication of this gap, for policy toward gangs, is that membership depends on the incentives for investment, and the feasibility of investment, for the individuals initially characterized by $s_i < s^R$.

The gap between the behavior of gang members and the rest of society could be perceived by the latter as reflecting irrational behavior, but the gap clearly emerges from a rational choice of how much to invest in group specific human capital.

Figure 1

Ex post group human capital distribution.

$\underline{s}_N$_____s^* Region of zero density $\underline{s}^R$_____s_i

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Gang Size

We turn now to the size of the gang, that is, to the level of group human capital necessary to join the gang. This level is chosen by the leader, who must consider the work carried out by a gang member, and also the possibility that the member may betray the gang. Let us assume that, for each betrayal, the gang leader bears a cost, W, which could be the monetary equivalent of associated criminal punishment or the loss of reputation. The expected number of betrayals is εn.

Each member of the gang appropriates $\beta_i(s_i)\ y(n)/n$, and the remaining output, defined as $\pi\, y(n)$, with $0 \leq \pi \leq 1$,[11] is a residual assigned to the leader of the gang Therefore, the expected payoff of the leader is given by

$$V = \pi y(n) - \varepsilon n W \tag{2}$$

The expected payoff of the leader is given by the expected surplus of the gang appropriated by the leader minus the expected costs from betrayal. The size of the gang is determined by the leader by solving the associated maximization problem.

There leader must consider two effects. First, there is a marginal loss for the leader from increasing the required level of group human capital (since members will be of higher quality and, according to (2), will appropriate more at the expense of the leader). The second, offsetting, effect arises from the impact on returns from reducing membership numbers by increasing the level of group human capital.

If there were no possibility of betrayal, and since we do not explicitly consider other costs from expansion, the gang would comprise the entire population, since there would be no cost to the gang's leader from adding further members. A wider membership increases the criminal surplus and a reduction of group human capital increases the share appropriated by the leader (since lower quality members of the gang receive lower personal shares in the surplus). Therefore, assuming no other costs, the optimal size is an interior solution only if the expected cost from betrayal is reasonably high.

The likelihood of betrayal deters the gang leader from hiring more members. Therefore, our model shows that investment in group human capital is rational from the viewpoint of individual members (to become gang members) and from the gang leader's viewpoint (as a mechanism to deter betrayal by decreasing the relative value of outside opportunities). Furthermore, the danger of betrayal is the motivating factor for expecting regular signaling of

11. Technically, the difference between the shares appropriated by the leader and the sum of the shares appropriated by members can be explained by transaction costs resulting from the internal competition for rents.

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the commitment of gang members, which leads to the theatrical, apparently irrational behavior that is often observed.

We must verify that V is positive. There is a level of expected punishment εW above which the payoff of the gang's leader is negative and therefore it would not be profitable to run the gang at such a level: deterrence is a possibility. For the sake of analysis, let us assume that such a level of expected punishment is not feasible: that is, the authorities cannot deter the gang's leader by threat of punishment, and V is kept positive. We may then analyze an increase of outside opportunities to gang members by changing ε, the likelihood of betrayal, which could refer to an amnesty.

An increase of the parameter ε will have three important effects:

1. For a given s^R, it will decrease s^* (from equation (1), more individuals are willing *ex ante* to invest in group human capital because outside opportunities after gang activities have increased);
2. It will decrease V (from equation (2), using the envelope theorem) - the gang's leader is then worse off since the probability of betrayal has increased;
3. Therefore, it will increase s^R (the gang's leader makes group human capital more demanding to offset the higher likelihood of betrayal).

The first and third effects generate the ambiguous result that a change in ε might increase or decrease the size of the gang depending on which effect prevails. On the one hand, the leader will increase the level of group human capital, but more individuals are willing to join the gang. Therefore, increasing outside opportunities for gang members might have the counter-productive effect of inducing more individuals to join a gang with a higher level of group human capital. This result does not close off the possibility in a criminal justice system of deterring the gang leader by creating very high penalties for organizing gangs. The result does warn us to be careful of inadvertently making gang membership more attractive, i.e. less temporarily worrying to would-be members, by increasing the value of outside activities that can be pursued after retirement from gang life. However, increasing the level of group human capital has one unambiguous result: the gang will be smaller, but nastier from the point of view of the population at large.

IV. CONCLUSIONS AND POLICY IMPLICATIONS

Gangs form under incentives derived from the direct and indirect costs and benefits of gang membership. Some extreme types of behavior have a rational purpose in enhancing the level of ex post human capital signaled by a gang

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member, which turns out to be a crucial element in the formation of a gang. The gang member is interested in revealing gang-relevant skills as the benefits of gang membership are participation in gang outputs and enjoying reputational benefits in dealing with people outside the gang. One testable prediction of our theory is that we expect, routinely, to find colorful signaling mechanisms, which create a distinct culture around the gang and separate the gang from its surrounding society. Such a gap is not purely a cultural phenomenon, but reflects incentive considerations.

We also predict that increasing the benefits of moving into mainstream society will tend to reduce gang membership, but can also induce changes in recruitment leading to remaining gang members being particularly nasty examples of the genus. The increase in severity of the gang predicted to follow from increasing outside benefits implies a need for tough action later on, if the gang is really to be suppressed. Such a hardcore residual membership does seem to be associated with efforts to clean up gangs by attracting members out via amnesty arrangements, and we think this is likely to be regularly observed in empirical work. The impact of enhanced outside opportunities on the size of gangs is theoretically ambiguous and a clear candidate for empirical investigation.

Criminal justice policy measures toward gangs can usefully focus on the two groups forming the gang. The first is more weakly associated with the gang and has invested in developing relevant human capital, and the second was endowed with a high level of it in the first place. According to our model, both groups are deterred if the gains from belonging to the gang are reduced by sufficient increases in the expected value of punishment (the severity of the penalty adjusted for the probability of applying the punishment) following the usual elements of deterrence analysis. Such deterrence is likely to be most cost effective when focused on the more weakly aligned group. Our analysis also suggests that making investments in gang culture more costly for impressionable members of the weaker group may help to keep them within mainstream society, supporting such moves as banning gang regalia in schools.

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SUMMARY

Behavior in dysfunctional social groups is often regarded by social scientists as irrational in nature. We focus on many features of behavior within the street gang, also noting the existence of other gang-like groups, and show how apparently irrational behavior can signal the possession of valuable human capital. We contend that gangs are formed around particular traits of direct value to the group, and therefore of indirect value to the gang member, and construct a model with a separating equilibrium consistent with the existence of a large gap between the characteristics of gang members and the rest of society. Policy implications include a deduction that increasing the opportunities for gang members outside of life in the gang, perhaps through offering an amnesty, might reduce gangs but will unambiguously make remaining gangs even nastier.

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